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Veterinarian injuries associated with bovine TB testing livestock in Michigan, 2001

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ABSTRACT

Testing all the cattle in an entire state with a uniform procedure for each animal affords an opportunity to relate human injury data to a known number of animals handled while carrying out a standardized procedure. Our objective was to describe the type and incidence density of injuries associated with TB-testing a large number of cattle herds, and to delineate the various factors associated with the risk of injury. A survey was mailed to all veterinarians ($N = 259$) who had completed at least five official bovine TB (bTB) herd tests in Michigan in 2001. We collected data regarding basic demographics and health status, work experience, veterinary specialty, and practice information. Each veterinarian was also requested to complete a separate injury questionnaire for each injury received while TB testing livestock in 2001. Accurate addresses were found for 247 eligible veterinarians, 175 (71%) of whom returned the survey. Thirty-six veterinarians reported a total of 53 injuries (10 major, 12 minor and 31 self-treated). Hands (29%) and legs (21%) were the anatomic locations most frequently injured, with sprains/strains (30%) and abrasion/contusion (30%) the most common types of injuries sustained. The overall incidence density of injuries was 1.9 per 10,000 animals tested. Female gender (RR = 3.3), being employed by the government (RR = 4.5), and smoking (RR = 6.0) were significantly associated with a higher rate of injury. Significant colliniearities were found between some risk factors associated with an increased rate of injury and participants thought 81% of their injuries could have been prevented. These results are explained by the administrative structure of the bTB testing program in Michigan, and the changing demographics of the veterinary workforce.

1. Introduction

Twenty years after obtaining the bovine TB (bTB) Accredited-free status from the U.S. Department of Agriculture (USDA) in 1979, Michigan lost that designation to become a Non-Modified Accredited state on 22 June 2000 joining Texas as the only other U.S. state that did not have a free status for bTB. Michigan's loss of free status for bTB was due to the recent confirmation of *Mycobacterium bovis* infection in seven cattle herds in the northeastern portion of the lower peninsula of Michigan. To remain in compliance with the federal Pasteurized Milk Ordinance and the Michigan Grade A Milk Law of 2001 (Act 266, 2001) Michigan Department of Agriculture (MDA) required all

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dairy herds in the state (~3000 herds, ~300,000 milk cows) to be TB tested within 12 months. In addition, all beef cattle (~10,000 herds, ~700,000 cattle), bison (*Bison bison*) and goat herds in the state were required to be tested by the end of 2003 (Animal Industry Act, 2000; Michigan State and County Data, 2004). To meet this large-scale and immediate demand for TB testing, MDA hired federally accredited private veterinarians on a fee-basis to supplement the existing state and federal veterinary field staff. The fee-basis veterinarians were hired without selection for their current practice focus.

Veterinary practice presents occupational hazards from physical, biological and chemical agents (Jeyaretnam and Jones, 2000). An occupational-hazard survey found needle punctures, kicks and crush or handling injuries to be the leading cause of injury to veterinarians in large-animal practices (Poole et al., 1999) while cat bites, dog bites and needle punctures topped the list in companion-animal practices (Poole et al., 1998). A survey of American Veterinary Medical Association members in Minnesota and Wisconsin found hands, shoulder/arm, leg, head, back and feet to be the most frequently injured anatomic structures (Landercasper et al., 1988). Occupational injuries of zoo veterinarians have also been specifically studied (Hill et al., 1998), as well as practice hazards unique to pregnant veterinarians (Moore et al., 1993). In a large Minnesota study of all licensed veterinarians, factors associated with increased risk of veterinary injury included smoking, lack of sleep, lifting heavy patients, inexperience, and lack of availability of assistants. In contrast, factors associated with decreased risk of injury included participation in aerobic activities, increasing age and male gender (Gabel et al., 2002). Our objective was to describe the type and frequency of injuries in veterinarians associated with TB-testing a large number of cattle, bison and goat herds and to delineate the various factors contributing to the risk of injury associated with bTB testing in Michigan.

2. Methods

2.1. Animal testing

At the time of the study, cattle, bison and goats were screened for TB using the caudal fold test (CFT) with intradermal placement of 0.1 ml of USDA PPD (purified protein derivative) tuberculin under the tail head. A CFT is considered positive at 72 h when skin thickness of the injection site is palpable. If the CFT is positive, a comparative cervical test (CCT) is performed by a state or federally employed veterinarian (hereafter referred to as "regulatory" veterinarians). The CCT entails placing separate intradermal injections of biologically balanced USDA PPD tuberculin (0.1 ml) and avian PPD tuberculin (0.1 ml) in the midcervical area of the neck. The change in skin thickness at the PPD injection sites is measured 72 h post-injection, the responses are plotted on a scattergram, and the animal is classified as negative, suspect or reactor (USDA, 1999). For this study, the term "herd test" is non-specific and correctly refers to the testing of a single animal or alternatively, the testing of hundreds of animals comprising an entire herd.

2.2. Study population

The study population included all veterinarians who had completed at least five official TB herd tests in Michigan in 2001. The list of official herd tests was obtained from USDA, Animal and Plant Health Inspection Service, Veterinary Services—Michigan. The mailing addresses for all veterinarians licensed in Michigan were purchased from the Bureau of Health Professions, Michigan Department of Community Health. The lists were combined to create a mailing list for 259 eligible veterinarians, who collectively performed 9326 herd tests.

2.3. Data collection

The first survey instrument was mailed in September 2002. It was resent to non-responders, with a new cover letter, 3 weeks later. The survey was pilot-tested on 7 veterinarians to ensure the clarity of each question and the availability of adequately descriptive answer options. The survey questions were primarily close-ended or short fill-in-the-blanks. There was one open-ended question to allow the veterinarian the option to "in your own words, describe the circumstances leading to the injury and the injury itself". The survey was designed to take between 5 and 20 min to complete, depending on the number of injuries reported.

The characteristics collected from each veterinarian include: gender, age, practice type, years of practice, number of hours spent in vehicle each week, number of days worked per week, number of hours worked per week, number of hours of sleep per night, percentage of time spent on-call, self-assessment of health, number of times they exercised per month (defined as brisk aerobic activity lasting 20 min or more), tobacco smoking, tobacco chewing, seatbelt use, height and weight (to calculate body mass index) and percentage of time doing TB work.

The following information was collected for each injury: severity, month in which injury took place, when in the course of the farm visit the injury occurred, availability of assistants, location on body, type and cause of the injury, type of animal or equipment involved, factors associated with the injury (animal behavior, facilities, weather, assistants, personal issues), whether the current injury was a re-aggravation of a prior injury, as well as the responding veterinarian's opinion on the preventability of the injury.

2.4. Classification of injury

Veterinarians were asked to categorize their injuries as major, minor and self-treated. Major injuries were defined as injuries that required immediate treatment (hospitalization, outpatient visit to an emergency room or urgent-care center) within 4 h of incident and/or resulted in >16 h of lost work time. Minor injuries were defined as requiring non-immediate treatment for the injury from a physician or human-health professional within seven days of the incident and/or 4–16 h of lost work time. The self-treated category included treatment they provided themselves or from their veterinary staff and resulted in <4 h lost work